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Project Report

BRITISH COLUMBIA FINANCIAL REVIEW: THE ISSUE OF ENVIRONMENTAL COST

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Executive Summary—Environmental Cost

This report details the costs which government now faces to remove contamination and toxic elements from air, soil and water.

It finds that the province is in the very early stages of uncovering, estimating, and providing for these cleanup costs. There are roughly 1,600 known and potentially contaminated provincial sites which have not been assessed.

The cleanup costs for just those sites known to be contaminated range from $130 to $325 million.

In total, the cost of sites for which the province either is directly responsible or could become responsible could be as high as $400 to $500 million.

The report concludes that the province has in the past missed opportunities to establish and enforce the cleanup liability of site owners. As a result, cleanup costs borne by the taxpayer will increase.

The report recommends:

- Develop a centralized registry of contaminated sites.
- Conduct an evaluation of the Provincial Emergency Program.
- Expand incentives to encourage preventive environmental management approaches.
- Develop a pollution prevention program for the government.
- Set charges for pollution offences high enough to deter environmentally damaging activities.
- Provide incentives for local governments to conserve water and other environmental resources.
- Establish new policies to address the compensation of redesignated Crown lands.
- Develop methods of risk assessment for environmental emergencies.
- Develop methodologies for assigning values to environmental assets.

- Identify market-based instruments that would provide incentives to environmentally sound behaviour.
- Conduct an environmental assessment of provincial government budget.

The Issues of Environmental Cost

In this report, we discuss a variety of environmental issues that can have a major impact on the costs and revenues of the provincial government. We caution that very little information on the cost and revenue implications of environmental issues was available from the government on a province-wide basis—the state of the information is itself an issue. As a result, our primary emphasis in this paper has been to raise key issues, describe the current situation and suggest further research.

A. Description

1. Primary and subsidiary issues

a) Cleanup of environmental contamination and degradation

The provincial government will face significant future environmental cleanup and reclamation costs in a number of areas, including:

- Cleanup of contaminated sites.
- Treatment and/or disposal of hazardous wastes.
- Removal of asbestos from buildings.
- Reclamation of land and aquatic habitats degraded by human activity (e.g., soil erosion, stream sedimentation).

Over the next decade, it will cost the government many millions of dollars to conduct these activities. While some costs may be recouped from the private sector, from other levels of government and from consumers (through increased charges), a significant portion of these costs will be unrecoverable. This represents a very significant unfunded liability to the government.

b) Environmental emergency preparation and response

The provincial government is responsible for responding to a variety of environmental emergencies such as floods, fires, earthquakes, and human-induced impacts such as oil spills. Each ministry that could potentially have an environmental emergency has some voted funds to respond. However, in

the event of a major environmental emergency, provincial government employees obtain funds from the Consolidated Revenue Fund (CRF) through an Order-in-Council to provide immediate response. As there is no way of predicting the frequency and size of major emergencies, no adequate amount has been included in the budget, despite the significant size of this expenditure. An average of $25 million has been spent annually to cope with major environmental emergencies over the past five years, excluding forest fires. Under the fire suppression program, an average of $55 million was spent annually over the past eight years.

c) Cost savings through environmental conservation and pollution prevention

Provincial government ministries and Crown corporations have many opportunities to reduce costs and environmental impacts. Specifically, these agencies can adopt strategies to conserve energy, reduce water consumption, reduce waste, reduce purchases, preserve land areas, and reduce air emissions. While some of these strategies require an upfront investment that will not yield a return for a number of years, many others can provide a payback within one year. Given the size of the provincial government and the accomplishments of many large, private sector organizations that have initiated environmental management programs, there is strong evidence to suggest that the government could achieve multi-million dollar savings within one or two years through improvements in environmental conservation and prevention.

d) Charges for pollution offences

The provincial government assesses pollution charges to environmental offenders. While these charges have been increased in recent years, some suggest that they do not yet reflect the full environmental costs of the actual pollution. It may be questioned how effectively the "polluter pays" principle is being applied. In some instances, taxpayers may be paying cleanup costs that should be borne by the polluter. Further, the environmental fines should be high enough to serve as a deterrent to environmentally damaging activities. Increased pollution charges could generate substantial further revenue to help pay for provincial environmental programs. They can also prompt companies to make their products and processes more environmentally benign.

e) Environmental incentives and disincentives

The provincial government could employ a wider variety of tools to encourage or discourage environmentally sound activities. By eliminating environmentally destructive incentives and introducing progressive incentives, the government can ensure that polluters pay the full cost of their activities and conservers achieve a benefit for their prudence. In many cases, environmental subsidies applied in one area can have significant cost spin-off

benefits in another. They can also generate short-term revenues through taxes, levies and other charges that are applied until an environmentally damaging behaviour is curtailed.

f) Valuation of environmental assets

It is important for the provincial government to ensure that its environmental assets (e.g., forests, fisheries, agricultural crops) are not being degraded so that it can receive the same economic benefits from those resources in the future as it does today. By assigning a value to its stock of natural capital and by measuring the change in the value of that natural capital over time, the government can determine whether or not its environmental assets are depreciating. It can then use the resulting information to make policy decisions to preserve its long-term economic and environmental value. This valuation approach can be incorporated into the management practices of the resource ministries at minimal cost.

g) Transfer payments to regional and local governments

Just as the federal government provides transfer payments to the British Columbia government for education and health care, the provincial government makes payments to regional and local governments to provide municipal services. In recent years, the most significant environmental transfer payments, for water supply and waste water treatment, have captured a larger and larger share of the total transfer payments. Unfortunately, many communities in British Columbia continue to be in violation of their water permits. The Ministry of Municipal Affairs indicates that it will likely cost about $1 billion by the year 2000 to comply with the provincial government water quality standards. This raises the issue of whether the provincial government will be required to increase its level of assistance to these municipalities and whether it can create incentives that will help to preserve the current environmental infrastructure.

h) Compensation for Crown land redesignated as park lands

About 6 per cent of the land in British Columbia is devoted to parks and wilderness areas. The new government has a stated commitment to double the park lands to 12 per cent of the total land base. Virtually all of the proposed parkland area is Crown lands so no acquisition costs will likely be incurred. However, the province may be required to pay compensation costs to holders of mining, mineral and timber harvesting permits. It is not possible to estimate the liability associated with these compensation costs; however, the short-term costs of policy development and public input are likely to cost $1 million per year over the next five years.

2. Entities involved

We have identified twelve ministries and Crown corporations that are materially affected by or strongly involved in environmental issues. These are:

- **Ministry of Environment, Lands and Parks**

  The Ministry of Environment, Lands and Parks has primary responsibility for environmental issues and has significant responsibility to address environmental cleanup costs, environmental emergencies, charges for pollution offences and environmental incentives.

- **Ministry of Energy, Mines and Petroleum Resources**

  As a natural resource ministry, the Ministry of Energy, Mines and Petroleum Resources must deal with a number of environmentally contaminated sites. It also has the potential to provide incentives for energy conservation or use of alternative fuels that have less impact on the environment.

- **Ministry of Forests**

  As another natural resource ministry, the Ministry of Forests has significant environmental clean up issues as well as the complex issue of prudent management of a renewable resource that provides a variety of ecological services.

- **Ministry of Agriculture, Fisheries and Food**

  This Ministry must deal with a variety of environmental contamination and land degradation issues as well as environmental incentives and disincentives for sustainable land use.

- **Ministry of Transportation and Highways**

  The Ministry of Transportation and Highways has major land holdings and therefore significant environmental cleanup costs. It also has increased costs to remove lead-based paints from bridges (it is now required to encapsulate these bridges during paint removal).

- **Ministry of Health**

  The Ministry of Health must deal with the difficult issues of biomedical waste disposal and increased use of disposable products. It would also benefit from reduced health care costs as a result of improved air quality in the province. The Ministry has a further role to play in environmental conservation by educating the public on how their diet affects their health and the environment.

- **Ministry of Municipal Affairs**

  This Ministry makes significant payments to local governments for water supply and waste water treatment. It also has a significant opportunity to encourage environmental conservation through its management of building and water codes.

- **Ministry of Aboriginal Affairs**

  The settlement of aboriginal land claims may result in some loss of environmental revenues through fishing, trapping, guiding and hunting licences. Settlement may raise compensation issues if existing timber, mining or mineral rights are reduced.

- **B.C. Hydro**

  As a major land holder, B.C. Hydro faces major environmental cleanup costs. It also has a significant role to play in environmental conservation and in the provision of environmental incentives.

- **B.C. Buildings Corporation**

  As the landlord of 3,500 provincial government owned buildings, this corporation faces a variety of environmental cleanup and remediation costs. It also has a role to play in environmental conservation and the provision of environmental incentives.

- **B.C. Rail**

  B.C. Rail owns many land areas with significant environmental cleanup costs. However, it also provides an environmental benefit of reduced air emissions because rail freight transportation is more energy efficient than truck freight transportation.

- **B.C. Transit**

  This Crown corporation has the opportunity to implement many measures that would significantly reduce air emissions in the province. Many of these could be directed at the public to encourage greater use of public transportation.

- **B.C. Ferry Corporation**

  B.C. Ferry Corporation faces significant environmental costs to install sewage treatment facilities on its vessels and to reduce solid waste in its operations.

3. Related issues

a) Revenue impact of aboriginal land claims

As indicated above, the settlement of land claims could reduce provincial government environmental revenues that would otherwise have been received from fishing, hunting, trapping and guiding licences. However, as those licence programs were designed to be revenue-neutral, the reduced administration costs to provide the licences may fully offset the reduced licensing fees. The Ministry may further have to pay compensation costs to private sector firms for lost mining, mineral and timber rights.

b) Fiduciary obligation to provide sustenance resources to aboriginal peoples

The provincial government has a fiduciary obligation not to arbitrarily interfere with traditional "sustenance activities" of aboriginal peoples on unoccupied Crown land. Thus, when fish, wildlife or plant populations are scarce, some aboriginal peoples may be given priority access to these natural resources and access by non-aboriginal peoples may be restricted. This has the financial impact of reducing revenues from fishing, hunting, guiding and trapping licences as well as increasing costs to monitor fish and wildlife resources when populations are low.

B. Government policies

Through the Ministry of Environment, Lands and Parks, the provincial government has a stated mission to "manage, protect and enhance the environment for the benefit of present and future generations." It has also set out eight guiding environmental principles, which are presented in Exhibit 1.

In addition, a number of other ministries and Crown corporations have prepared their own environmental policy statements. These entities include:

B.C. Buildings Corporation
B.C. Hydro
B.C. Transit
B.C. Rail
B.C. Ferry Corporation
British Columbia Purchasing Commission
The British Columbia Round Table on the Environment and Economy.

Exhibit 1
Guiding environmental principles for the Ministry of Environment, Lands and Parks

- The fundamental needs of people, both now and in the future, must be met—including good health and nutrition, shelter, clothing, employment and community stability.

- Society must develop a respect for the natural environment and its living components which must be recognized as having an inherent value of their own, and not simply to provide material benefits for humanity.

- The goals of environmental integrity, economic prosperity and social stability must take into account local, provincial, national and global concerns.

- Decisions on resource use and economic development must integrate the consideration of environmental impacts. Protection of the environment can never again be an afterthought—it must become an essential part of the decision making process.

- Decisions on resource use must weigh the potential effects on the entire ecosystem, not the individual impacts on component parts.

- Over the long term, the focus must on sustaining the unique biodiversity of this province.

- Our approach to economic development must be compatible with maintaining a sound environment. The emphasis should be on sustained economic prosperity that does not permanently reduce or damage our natural assets. As well, we should concentrate more on intensively managing the resources we have already exploited.

- The public has a right to get information on, and take part in, decision making that could effect environmental quality. The government should promote such education and involvement through an open administration and frequent public consultation.

The environmental principles put forward by the British Columbia Round Table on the Environment and Economy address all individuals and organizations within the province. They are based substantially on the work of the World Commission on Environment and Development, which originated the idea of sustainable development. The statements of environmental principles, environmental policies and environmental codes of practice for these aforementioned organizations are presented in Appendix A.

The key issues emphasized in these environmental policy statements are summarized in Exhibit 2. We note that the absence of a check mark beside a particular issue does not indicate that the agency at hand does not support that issue. It simply means that the particular issue was not specifically mentioned in the agency's environmental policy statement.

To adhere to their environmental policies, these public agencies will likely face increased environmental costs in the following areas:

- Environmental auditing and subsequent reporting.
- Public participation programs.
- Staff training and education.
- Centralized environmental data collection.
- Environmental research and development.

These environmental activities and their associated costs are discussed in the following section. We emphasize that these activities do not represent a permanent drain on the financial resources of the provincial government. Many of the costs will be recouped through greater efficiencies, reduced costs, improved employee loyalty, charges back to the customer and so on. The potential for cost recovery is discussed in section F of this report.

C. Government practices

Virtually all provincial government ministries and Crown corporations have introduced major new environmental initiatives in recent years. These are discussed individually in the following subsections.

1. Ministry of Environment, Lands and Parks

The former Ministry of Environment was given a strong environmental mandate and has introduced a wide variety of new and innovative environmental programs over the past five years. There is every indication that this high level of commitment will continue in the new amalgamated Ministry of Environment, Lands and Parks. The Ministry has prepared a detailed, long-term strategy which it has put forth in a document released in August 1991, entitled, **Environment 2001: Strategic Directions For British Columbia**. Realizing that it cannot accomplish everything, the Ministry has identified priority areas to deal with pollution threats and resource management issues. Concerning pollution threats, the Ministry identified an initial list of 121 sources of pollution and selected 12 that it felt posed the highest pollution risk. These include the following:

Exhibit 2
Key points emphasized in environmental policy statements of various provincial agencies

Environmental Issues	Ministry of Env., Lands and Parks	B.C. Buildings Corporation	B.C. Hydro	B.C. Transit	B.C. Rail	B.C. Purchasing Commission	B.C. Ferries	B.C. Round Table on Env. & Economy
Meet/exceed laws and regulations		√			√		√	
Maintain environment quality for future generations	√		√					√
Work with other sectors of society			√	√	√		√	√
Integrate economic, social and env. considerations	√	√	√					√
Maximize resource use efficiency		√	√			√	√	
Preserve ecological biodiversity	√							√
Provide incentives to prevent pollution		√		√				
Provide public access to information	√						√	
Expand public awareness of environmental issues			√	√	√	√		
Contribute to global environmental solutions		√						
Provide staff training and education		√			√		√	
Provide adequate financial resources					√			
Conduct env. auditing and corporate reporting			√		√		√	
Protect the environment for its own sake	√							√

Contaminated sites	Damage to drinking water quality
Persistent organic chemicals	Heavy metals
Toxic chemical spills	Industrial liquid waste
Industrial emissions	Hazardous waste
Mine waste	Pesticides
Pulp mill effluent	Agricultural waste

The Ministry identified 24 major resource issues, of which it has selected five as being most pressing to deal with. These are, in order of importance, the following:

- The potential impacts of global climate change.
- Loss of natural areas, land productivity and biodiversity.
- Site-specific impacts of development on natural systems.
- The encroachment of urban areas on natural and productive lands.
- Cultural, recreational and scenic concerns created by development pressures.

Many of these and other environmental issues are inter-related and the Ministry has a stated policy of favouring initiatives that provide benefits in multiple areas. They also favour an emphasis on preventing pollution and preservation of natural resources as opposed to addressing problems after they occur. The Ministry acknowledges that the private and public costs associated with environmental issues in the province will be in the billions of dollars. However, they also point out that these costs may rise even more if environmental issues are not addressed today.

The Ministry has a budget of about $225 million per year, plus about $25 million in revenues that it receives from environmental taxes, levies and pollution charges. The Ministry is proposing to expand its taxes, levies and pollution charges, which will generate an additional $30 to $50 million per year, if approved.

2. Ministry of Energy, Mines and Petroleum Resources

Key environmental initiatives within this Ministry include the following:

- Upgrading the environmental assessment process—The Ministry has recently upgraded the Mine Development Assessment Process (MDAP) to address a wider range of environmental concerns related to new mine development.
- Securing funds for mine site decommissioning—The Ministry has reviewed all existing mines within the province and is encouraging private sector companies to put aside sufficient funds to pay for the decommissioning costs once the mine has reached the end of its useful life.

- Cleaning up contaminated sites—The Ministry has cleaned up some sites and is developing plans to clean up additional contaminated sites, particularly within the mining and oil and gas sectors.

While the Ministry is the major regulatory authority for energy, it does not currently provide incentives to reduce energy consumption. However, the Ministry is proposing to establish research and development funding for clean energy technologies.

3. Ministry of Forests

The Ministry of Forests has increased its attention to environmental issues in recent years. In many areas, its current forest management practices are far superior to those that existed even one decade ago. Some of its major environmental initiatives include the following:

- Increase in stumpage fees—While the increase was not implemented solely for environmental reasons, it did have the effect of encouraging forestry companies to adhere to a higher level in harvesting activities.

- Erosion control—The Ministry is placing increased attention on new road and bridge construction to ensure that the potential for erosion is minimized.

- Reforestation—The Ministry spends about $180 million per year on reforestation programs.

- Preservation of ecologically unique land areas—The Ministry converted two significant land areas into protected parks (the Carmanah and the South Moresby National Park).

- Forest inventory mapping—The Ministry has a comprehensive program to map the working forest in British Columbia.

Despite a significant increase in environment-related forestry expenditures in recent years, the Ministry continues to face strong criticism from environmental groups. Many people continue to feel that the forests are being cut even though the Ministry has a "sustainable harvest" policy. It appears that insufficient data exists to accurately determine whether or not the forests are being cut at a faster rate than they are being restocked. Senior foresters within the Ministry have stated that British Columbia's forests may be being overcut. As a result, it could face increased environmental costs in the future to respond to public concerns.

4. Ministry of Agriculture, Fisheries and Food

The Ministry has launched over 200 environmental initiatives to promote sustainable agriculture and fisheries. These include the following:

- Hog manure guidelines—Provincial guidelines have ben established on the density, volume and timing of manure spreading to minimize adverse environmental impacts.
- Pesticide reductions—Farmers are encouraged to reduce their applications of pesticides.
- Food waste reductions—Food producers/distributors are encouraged to minimize waste in the packaging, display and transportation of food.
- Organic product standards—The Ministry is going beyond Agriculture Canada standards to introduce new standards for organic produce and new labels for imitation dairy products (e.g., soya-based cheese).

Unfortunately, monetary incentives continue to exist that have the potential to promote environmentally damaging behaviours. The Ministry is working internally and wi' the federal government to reverse these subsidies.

5. Ministry of Highways and Transportation

This Ministry has developed several policies to address environmental concerns. For instance, an environmental review is included in all of its major construction projects. This represents a cost of about $100,000 per project, or over $1 million annually.

Over $2 million is budgeted for general environmental studies and projects this year. Other environmental projects being carried out include:

- Construction mitigation ($0.8-$1 million).
- Wildlife fencing ($5 million over five years).
- Kokanee spawning habitat enhancement ($300,000).

The Ministry has further established a pavement recycling program that saves $14 million per year in repaving costs using a new technology that removes old pavement, melts it down, and replaces it in one smooth operation.

The Ministry is in the process of establishing an Environmental Services Branch. It is also involved in a joint planning committee with BC Transit, B.C. Ferries, Greater Vancouver Regional District, Capital Regional District and the Ministry of Economic Development.

6. Ministry of Health

This Ministry has a small, developing environmental health unit consisting of three people and an operating budget between $350,000 and $400,000 annually. This unit has focussed its efforts on addressing "hot spots" that develop throughout the province.

The disposal of medical waste is a growing concern for this Ministry for the following reasons:

- More disposable items are being used in medical facilities as protection against AIDS.
- Some landfill sites are refusing medical waste, forcing hospitals to ship their waste to United States-based landfill sites. This represents a cost of about $3 million for five hospitals. If all hospitals were forced to divert their waste in a similar fashion, total costs could amount to $30 million per year. The Ministry expects this cost to be absorbed within hospital operating budgets.

The Ministry has a number of internal environmental programs, such as the recycling of paper, aluminum, glass, and plastic Care Cards.

7. B.C. Hydro

B.C. Hydro has made significant environmental expenditures in recent years and has launched a number of major environmental programs. In the 1991/92 fiscal year, it spent about $20 million on the environment. However, based on experience in other jurisdictions, these costs could rise significantly. For example, Ontario Hydro increased its environmental expenditures from $180 million to $245 million to $375 million from 1989 to 1991.

Some of B.C. Hydro's programs, such as the Power Smart Energy Conservation Program, are considered leading edge among North American power generating corporations. Other major environmental programs include the following:

- PCB removal and storage.
- Cleanup of contaminated sites.
- Management of fisheries and fish habitat.
- Energy conservation.
- Waste reduction.
- Environmental auditing.

In addition, a proposal has been submitted to senior management to launch a $1.5 million environmental strategy project to better identify the major environmental issues facing the Corporation and conduct a public consultation process. The public consultation process is designed to ask British Columbians which issues B.C. Hydro should address given that the associated expenditures will likely result in a corresponding increase in utility rates.

8. British Columbia Buildings Corporation

The British Columbia Buildings Corporation (BCBC) has launched one of the most progressive environmental campaigns within the public sector. It has established an environmental division and has taken action in the following areas:

- PCB storage.
- Asbestos removal.
- Identification of contaminated sites.
- Waste reduction.
- Energy conservation.

The Corporation recently prepared a five-year strategic environmental plan, which will be funded to a level of 10 per cent of the Corporation's net income (about $1.6 million/year) over the next five years.

9. B.C. Rail

This entity has a well-established environmental planning unit which has been in place for over a decade. It has developed a five-year environmental plan with over $7 million budgeted for administration and project activity over the next five years.

The BC Rail Environmental Committee has representation from several functions within the Ministry: Materials Management, Environmental Engineering Operations, Engineering, Labour Relations, Intermodal, and Risks.

Some of the initiatives developed by this committee include:

- Conducting environmental audits of their leased land sites ($100,000 budgeted per year). About 20 per cent of the twenty sites audited last year were found to have serious contamination problems, with an additional 60 per cent having some degree of contamination. With only twenty leased sites inspected of 400-500, it is difficult even to estimate the total cleanup costs to be borne by this corporation.

- Upgrading waste treatment facilities. Over $2 million was spent last year to improve existing facilities in response to increased public concern for the environment.

The railway system is at a disadvantage to truck carriers in marketing the environmental advantages of rail transport. While truck carriers must cover their operating costs with their sales revenue, they do not directly incur the expense of operating and maintaining our highway system. On the other hand, rail freight rates must be set at a sufficient level to recapture the entire costs of operating the trains and the railway track system.

According to one Ministry official, rail transportation has three times the fuel efficiency of a truck, that is, a train can carry three times the amount of freight per pound of fuel as a truck. This paradox results in an *incentive* for shippers to choose trucks over trains for economic reasons. Further study of the environmental benefits gained from using trains for freight may justify the development of new incentives to encourage use of rail transport.

10. B.C.Transit

This entity has a strong environmental thrust in its planning and marketing activities. It is a co-founder of the "GO GREEN" Committee, which also has representation from GVRD, the Ministry of Transportation and Highways, and recently, the Ministry of Environment. This committee is working to reduce single occupant vehicle (SOV) travel and pursue air quality initiatives with other government agencies and interest groups. B.C. Transit's share of the GO GREEN committee budget is about $100,000 per year.

Additional environmental initiatives being carried out by B.C. Transit include:

- **Training Employee Transportation Administrators (ETAs).** B.C. Transit instructs ETAs in transportation demand management for their organization.

- **Car Pool partner matching.** A pilot is underway using computer software to match potential car pool partners.

- **Transit Options Program.** Employers are encouraged to provide a transportation subsidy to their employees as a replacement to other benefits, such as parking spots, which tend to reinforce SOV travel.

- **Low emission vehicles.** B.C. Transit is purchasing buses with engines conforming to the U.S. Environmental Standards 92. These vehicles consume more fuel, representing an additional operating cost of $285,000 per year.

- **Air care.** A program is being developed to carry out emission testing for vehicles. Drivers must ensure that their emission rates are within standards established for the age of their vehicle before insurance is granted.

- **Investigation of alternative fuels.** About $700,000 is to be spent over the next three years to investigate natural gas, methanol, hydrogen fuel and so on.

BC Transit's success in promoting and executing its environmental initiatives can largely be attributed to its cooperation with outside agencies who share a stake in the programs. The Corporation spent about $1 million on environmental initiatives in 1991/92 and is budgeted to spend $500,000 to $600,000 in the next two fiscal years.

11. The B.C. Purchasing Commission

The B.C. Purchasing Commission has established a major program to purchase environment-friendly products and services as well as to identify areas in which the government could reduce purchases through material resource conservation. In addition, the Commission attempts to increase the supply and demand for environmentally sensitive products and encourages economic development in recycling and related industries.

The Commission has found that, in many cases, the cost differential between traditional products and environmentally sound products is not that substantial. In fact, the environmental alternatives are sometimes cheaper. For example, the Ministry of Forests put in a request for rubber matting for seeding refrigerators at its Seed Centre. The successful bidder provided mats made from 100 per cent recycled scrap tires at a cost saving of $300 over virgin rubber mats.

A few specific environmental initiatives that have been undertaken by the Commission include the following:

- Through an initiative to increase the purchase of recycled paper, the Queen's Printer now buys 95 per cent recycled paper at a 7 per cent average premium over virgin paper (the remaining 5 per cent is special use paper). Recycled paper is also used for 20 per cent of photocopying paper supplies The Commission pays an estimated premium of $95,000 annually for their recycled paper purchases.

- The Postal and Distribution Services Group is working to develop self-mailers to reduce the use of envelopes.

- The Queen's Printer is recycling silver and various hazardous chemicals in its printing process (the revenues from the reclaimed silver completely offset the increased decontamination costs).

- A travel management planning program, called Travel Smart, has been launched to reduce travel costs a minimum of 10 per cent through travel alternatives such as teleconferencing and video conferencing.

- The Warehousing and Asset Inventory Recovery Branch (WAIR) is collecting plastic charges and printer ribbons and returning them to the supplier for recycling (it receives a 5-7 per cent cost reduction on the purchase of recycled cartridges).

Perhaps its most significant initiative is a plan to convert 20 per cent of the government's vehicle fleet to alternative fuels. At a conversion cost of $2,000 for propane and $3,500 for natural gas, it will cost about $2.8 million to achieve the 20 per cent target. Vehicle Management Services is currently using re-refined oil in 20 per cent of its vehicles and is actively seeking ways to recycle batteries, oil filters and anti-freeze.

12. B.C. Ferry Corporation

This corporation has established an Environmental Department with a budget of about $300,000/year. It has initiated a number of management initiatives, including:

- A waste reduction program to reduce packaging and other types of solid waste.

- A waste composition study to determine the types and quantities of waste it generates.

- A transition to bulk dispensers which reduce packaging waste by eliminating the amount of single-serving packages (annual savings are estimated at $36,000/year).

B.C. Ferry Corporation employees report that the corporation's waste disposal fees are rising dramatically due to increased landfill tipping fees. As fees continue to rise, the abovementioned waste management initiatives will save more and more costs for the corporation.

Perhaps the most significant environmental cost to B.C. Ferry Corporation is associated with the installation of improved sewage treatment facilities on its vessels. The corporation has spent $500,000 on sewage treatment in 1991 and is budgeted to spend an additional $6.5 million in 1992/93.

D. Basis of assessment

Our primary basis of assessment was to determine the type and magnitude of environmental costs that would have a material impact on the present or future expenditures and revenues of the provincial government. We also compared the government's environmental practices and associated costs against its stated

environmental policies and principles. We further assessed the government's environmental performance in terms of its effort to make environmental expenditures today that will reduce the need to make environmental expenditures in the future. In certain cases, we compared the environmental expenditures made in British Columbia with those of other Canadian and United States jurisdictions.

E. Analysis

We conducted interviews with each of the major entities that have major environmental issues. We further reviewed senior level strategic documents that outlined policies, programs, and expenditures in particular areas. In cases where the information did not fit with our own knowledge of provincial government environmental activities, we conducted further interviews with government staff.

Given the scope of this paper, we did not undertake a detailed analysis of each environmental cost issue. Rather, we tried to obtain a broad understanding of the issues and factors that affect total provincial government environmental costs. Where appropriate, we provided one or two examples. We caution that these issues are very complex and that this report should only be considered a starting point. To fully understand the cost dimensions of each issue would require a very significant research effort, as very little information has been centrally compiled on this topic.

F. Findings and conclusions

1. Cleanup of environmental contamination and degradation

As indicated earlier, the provincial government faces significant cleanup costs for a variety of types of environmental contamination and degradation. The relative importance of each type of environmental issue to particular government agencies, is presented in Exhibit 3. We have not addressed the environmental costs to upgrade buildings to earthquake seismic codes in this report. However, depending on changing public attitudes, this could become a significant additional environmental cost issue.

a) Cleanup of contaminated sites

It is extremely difficult to estimate the unrecoverable costs that will have to be paid out by government departments or Crown corporations to clean up contaminated sites within the province. The costs for cleaning up a particular site vary from a few thousand dollars to many millions of dollars depending on a number of factors including the following:

- The future intended use of the site.
- The time frame over which the cleanup is conducted.
- The degree of "cleanliness" that is to be achieved.

Exhibit 3
Priority environmental mitigation issues by ministry and Crown corporation

Ministry/Crown Corporation	Cleanup of Contaminated Sites	Treatment/ Disposal of Hazardous Wastes	Removal/ Containment of Asbestos	Reclamation of Degraded Habitats
Environment, Lands and Parks	√√√	√√√	√	√√
Energy, Mines and Petroleum Resources	√√	√√		√√√
Forests	√			√√√
Agriculture, Fisheries and Food	√	√		√√√
Transportation and Highways	√√	√		√√
Health		√		
Education		√		
B.C. Hydro	√√√	√√	√	√√√
B.C. Buildings Corporation	√√	√√	√√	
B.C. Rail	√√	√		√
B.C. Transit	√	√		
B.C. Ferry Corporation	√	√		

Check marks (√) denote importance of issue to corresponding Ministry or Crown corporation.

- The public perception of the health risk of the contamination.
- The actual extent of contamination compared with the estimated contamination from the initial site assessment.
- The availability of treatment and disposal facilities.
- The development of new treatment and disposal technologies.

To put boundaries on the probable costs associated with the clean up of contaminated sites, we have prepared some very rough estimates based on discussions with the six ministries and agencies with the highest probable cleanup costs (see Exhibit 4). We caution that these estimates are very approximate and actual cleanup costs could fall well outside of the ranges presented in the exhibit.

Exhibit 4
Estimate of probable range of public sector cleanup costs for contaminated sites to the year 2000 ($ million)

Ministry/Crown Corporation	Budgeted Costs 1992/93	Probable Range of Total Cleanup Costs to the Year 2000	% Likely Recover-able	Range of Unrecoverable Cleanup Costs
Environment, Lands and Parks	$11.8	$60-$110	10 %	$54-$100
Energy, Mines and Petroleum Resources	1.2	10-20	50 %	5-10
Transportation and Highways	0.2	2-4	0 %	2-4
B.C. Hydro	2.0	20-80	90 %	2-8
B.C. Buildings Corporation	1.0	10-60	20 %	8-48
B.C. Rail	0.2	16-20	80 %	3-4
Other ministries/Crown corporations	1.0	10-30	50 %	5-15
Total*	17.2	$130-325	~ 50 %	$65-180

Source: Discussions with Ministry or Crown agency officials.

**Total forecast amounts are rounded to the nearest $5 million.*

As you will observe, we have prepared two columns indicating the range of cleanup costs: total costs and unrecoverable costs. The recoverable portion of the cleanup costs is likely to come from one or more of the following sources:

- **Charges to a private sector polluter**

  In a number of cases, especially in high-risk situations, the government will be required to pay for upfront cleanup costs at contaminated sites. The government will then try to recover these cleanup costs from the party responsible for creating the contamination. The main instances when the government will not be able to recover its costs are when the responsible party is unknown or when the responsible party does not have the ability to pay the costs. Based on past experience, government officials believe they will be able to recover about 80 per cent of their costs from known responsible parties.

- **Cost sharing agreements with the federal government**

  A special federal/provincial fund has been established to clean up high risk, orphan contaminated sites across Canada and to develop and demonstrate technologies. A maximum of $250 million is available, funded 50 per cent by the federal government and 50 per cent by the provinces. The total amount available to British Columbia is $29.7 million of which the province must contribute $14.85 million over the next five years to receive the maximum benefit from the program. Ministry officials are of the opinion that the provincial government will not likely spend the full $14.85 million and therefore not receive the full benefit of the program.

- **Increased costs to consumers/customers**

  In the case of Crown corporations, a significant portion of substantial cleanup costs for contaminated sites could be passed on to the customer. For example, if B.C. Hydro incurs significant cleanup costs, it could apply to the British Columbia Utilities Commission (BCUC) to increase power rates. Similarly, significant cleanup costs paid by the B.C. Buildings Corporation could eventually be reflected in higher rental rates to its tenants.

- **Change in market value of properties**

  For contaminated sites that are associated with real estate transactions, the cleanup costs may simply be factored into the selling price of the property. If a contaminated site is cleaned up prior to the sale of the property, the cleanup costs may be more than recovered in the increased sales price. Conversely, if a particular site is not cleaned up prior to the property sale, the resulting price discount may be small in relation to the total sale price. For example, the B.C. Buildings Corporation has a $10 million property with about $300,000 to be spent on cleaning up soil contamination. The fluctuation in the market price of the property is of greater financial consequence than the cleanup costs. While there is a loss of property value in this situation, there is no direct expenditure that must be made by the taxpayer.

Based on these factors, we estimate that the provincial government, including Crown corporations, will likely have to spend between $65 and $180 million to clean up contaminated sites by the year 2000. However, budgeted cleanup costs for contaminated sites in 1992/93 are only about $17 million.

A number of ministries and Crown corporations are in the process of investigating their land holdings to determine whether contamination problems exist and what treatment methods and costs will be associated with

their clean up. These investigations are expensive and time consuming. At the current rate, it will be more than a decade before current property holdings have been investigated.

The number of sites that have been assessed as a percentage of total sites that contain or have contained fuels and other toxic materials is presented for seven Crown agencies in Exhibit 5. Of the 718 sites assessed, less than 400 were determined to be contaminated, and they were primarily private sector sites reported to the Ministry of Environment, Lands and Parks. The cleanup costs for these contaminated sites will be borne by the polluting companies.

Exhibit 5
Proportion of sites that have been assessed for contamination at seven provincial government Crown agencies

Ministry/Crown Corporation	Total No. of Sites[1]	No. of Sites Assessed	% of Assessed Sites
Environment, Lands and Parks	300	250	83%
Energy, Mines and Petroleum Resources	92	52	57%
Transportation and Highways	250	12	5%
B.C. Hydro	911	284 [2]	1%
B.C. Buildings Corporation	650	100	15%
B.C. Rail	400 [3]	20	5%
B.C. Transit	100	0	0%
Total	2,703	718	27%

1 *Represents the number of sites that contain or have contained fuels and/or other toxic materials. Except for the sites listed under the Ministry of Environment, Lands and Parks which are known to be contaminated, only a small percentage of these are likely to be contaminated.*

2 *These sites were assessed in preparation for re-sale and only three were found to be contaminated. B.C. Hydro properties are continually under assessment, with contamination problems being addressed as part of ongoing maintenance operations.*

3 *Includes real estate properties only.*

The Ministry of Environment, Lands and Parks maintains files on each site, which are reported to or discovered by the Ministry in a number of ways, including:

- From the Ministry's regional offices' inspection and monitoring activities.

- From other provincial government agencies.
- From municipal and regional governments.
- Industrial development approval process applications.
- Spill reports.
- Private sector operational environmental audits.
- Waste management permits or approval monitoring activities.
- Environmental audits conducted as part of real estate transactions.

The largest and best known contaminated site in British Columbia is the Expo land adjacent to B.C. Place Stadium in Vancouver. This site became contaminated as a result of years of industrial activities conducted at the site prior to the Expo fair in 1986. When the land was sold to Concord Pacific Development Ltd. in 1987, the provincial government agreed to pay the cleanup costs for the site. As can be seen in Exhibit 5, the government has paid about $17.5 million to date to clean up the site and is budgeted to spend an additional $8 million in 1992/93. The remaining costs to restore the site are estimated at $30-$80 million. Even though a substantial amount of the contaminated soil has already been excavated at this site and more work has been done to assess the remaining contamination than at any other contaminated site in the province, the total cleanup costs still remain highly variable. This is a prime example of how difficult it is to estimate contaminated site cleanup costs.

In addition to the cleanup costs presented in Exhibit 5, the government has a number of even less quantifiable liabilities associated with contaminated sites management. These liability issues are discussed as follows:

- **The government may have inadequate means of cost recovery**

  The provincial government is only statutorily eligible to recover its costs for contaminated land cleanup from a known polluter in the case of an emergency. Thus, while a significant health risk may exist at a particular contaminated site, if the contamination is not the direct result of an emergency event, the government has no statutory basis by which to charge back its cleanup costs to the party responsible for the contamination.

- **The government has a disclosure liability**

  The government may be held liable if it fails to disclose information in its possession about a contaminated site to a private sector party. For example, if a private firm asks the Ministry about site contamination on a piece of land it wishes to purchase, is refused this information, and later finds contamination, the Ministry may be liable for withholding this information. Some municipalities have been held liable when they had information (albeit non-environmental information) in their files that they did not release to private firms requesting it.

- **The government is exposed to negligence liability**

  As a result of recent legislative decisions by the Supreme Court of Canada, public agencies have a greater risk than private ones of being held liable for negligent regulation. In the context of contaminated sites, few requirements are included in the Waste Management Act (WMA) concerning the format or substance of contaminated site cleanups. As a result, the government could be criticized for having too few legislative guidelines for its regulators. A second consequence of unclear regulations is that courts have generally stated that affected persons must be able to determine their legal obligations with sufficient precision.

- **The government is taking on liabilities from local governments**

  Because existing laws do not specify the responsibilities and boundaries of authority for local government regulation of contaminated sites, local governments are attempting to deflect their liability to the provincial government. For example, they have increasingly been requiring and referring environmental assessment studies for development proposals to the Ministry of Environment, Lands and Parks. This has significantly increased the delays in reviewing some development proposals.

- **The government is potentially liable for mine site decommissioning and orphan wells cleanup**

  Since 1989, the Ministry has collected securities from mining companies to pay for reclamation costs upon mine closure. Many of these securities are not sufficient to recover reclamation costs and the Ministry is currently upgrading reclamation securities to realistic amounts. While the Ministry is still financially exposed, it has made significant progress; the Ministry now holds $78 million of reclamation securities in trust, up from $18 million five years ago.

The Ministry is also exposed to cleanup costs in the petroleum industry, where the Ministry applies a deposit of about $7,500 per well per operator. There are about 7,200 drilled wells at various stages of production or abandonment, and a total fund of about $6 million. As cleanup costs per well are typically $50,000 to $100,000 and there are about 20 known sites that must be cleaned up, this fund would appear adequate. Unfortunately, the current legislation stipulates that the Ministry can only access the deposit money on a well-by-well basis (thus, only about $7,500 is available to cover cleanup costs at a particular well site).

The primary method to reduce these liabilities appears to be to strengthen the existing legislation related to contaminated sites. New draft legislation is currently being proposed by the Ministry of Environment, Lands and Parks and the Ministry of Energy, Mines and Petroleum Resources to address these and other environmental liability issues.

b) Treatment or disposal of hazardous wastes

British Columbia has no major facility or facilities to treat or dispose of hazardous wastes. As a result, a significant quantity of hazardous waste materials is being stockpiled until a method becomes available for it to be treated or disposed of.

It is not possible to estimate the treatment and disposal costs for hazardous wastes held by the provincial government, because no data have been compiled on the quantity and types of hazardous wastes in each ministry and Crown corporation. The B.C. Hazardous Waste Management Corporation is currently conducting a hazardous waste characterization study, which will provide hazardous waste data on all industry sectors, including provincial government agencies. However, even when these numbers become available, the fees charged to treat or dispose of these wastes will not be known until treatment and disposal facilities are established. The only cost information we were able to obtain within the period of this review was for polychlorinated biphenyls (PCBs) at B.C. Hydro and B.C. Buildings Corporation and bridge paint removal at the Ministry of Transportation and Highways.

B.C. Hydro plans to replace a number of PCB-containing products and equipment by the year 2000 at a cost of about $42 million. These costs are only for replacing these PCB-containing items with non-PCB-containing items. They do not include costs to dispose of the waste PCBs as these costs are not yet known. The British Columbia Buildings Corporation is paying about $40,000 per year to store its PCBs.

Due to concerns about lead contamination, bridge rehabilitation has become more expensive for the Ministry of Transportation and Highways. Most painted steel bridges coated with lead-based primer must now be encapsulated when sand blasting work is being done prior to repainting them. This additional requirement represents between 20-30 per cent of the contract value, or a premium of 25-40 per cent compared with projects that do not require encapsulation. Total additional charges incurred for encapsulation work over the next five years are estimated to be over $4 million. The Ministry has been actively working with the Ministry of Agriculture, Fisheries and Food to develop guidelines for painting the bridges. These guidelines are intended to assist contractors who are just beginning to develop methods and tools for encapsulation work.

The cost of paint used by the Ministry is also being affected by environmental issues. Changing to non-lead-based paint will cost the Ministry an additional $900,000 annually.

c) Removal or containment of asbestos

We obtained probable costs for the removal or containment of asbestos only from the British Columbia Buildings Corporation. The corporation spent about $3 million in 1991/92 to remove or manage asbestos and is budgeted to spend about $2.3 million in fiscal 1992/93. Asbestos costs for this agency are anticipated to be about $2.5 million per year in the foreseeable future.

d) Reclamation of degraded land and aquatic habitats

This category of environmental cleanup costs refers to natural habitats that have been degraded by human activity (e.g., soil erosion, desertification, stream sedimentation). This is separate from hazardous materials contamination discussed earlier. It is yet another area for which the cleanup costs are impossible to estimate but which could be very significant for the provincial government. The Ministry of Forests, the Ministry of Agriculture, Fisheries and Food, and B.C. Hydro could suffer very significant negative cost impacts if they were required to completely restore land areas degraded by their activity.

In earlier years, clear cutting and road building activities by the Ministry of Forests caused significant soil erosion and stream sedimentation. In certain United States jurisdictions, environmental organizations have successfully sued state forestry departments and forced them to undertake costly measures to reclaim land areas degraded by forestry activities. However, the United States does not reflect the Canadian judicial process situation.

Agricultural activities frequently involve the use of pesticides, which can seep into the groundwater and make it unfit to drink. Similarly, manure from livestock operations can run off into receiving waters, thereby increasing plant

growth and reducing oxygen available for fish. It would be very costly to reclaim some B.C. streams that have been degraded by this type of activity.

Similarly, hydro electric dams built by B.C. Hydro have significantly altered the natural habitats above and below the dams. In certain locations, residents claim that the land areas have been significantly degraded and charge that B.C. Hydro should take steps to restore them. For example, residents along the Columbia and Peace River systems claim that these rivers have been substantially degraded by B.C. Hydro dams. B.C. Hydro may establish a trust fund of about $20-$30 million to reclaim the sites. As another example, claims have been advanced against B.C. Hydro in the Athabasca River delta where residents charge that reduced water flow caused by the Peace Canyon and W.A.C. Bennett Dams is destroying or has destroyed the delta wetlands. In this case, B.C. Hydro may be required to pay direct compensation or to reduce its water flows through the dam, thereby losing power-generating capacity. The reclamation costs associated with these dams are unknown.

2. Environmental emergency preparation and response

The provincial government provides response to environmental emergencies through the Provincial Emergency Program (PEP), which is operated through the Ministry of Attorney General. These emergencies can be divided into natural disasters and human-induced accidents. Environmental emergencies under these two broad categories include the following:

- Natural disasters:

  Floods
  Earth movements (land slides and rock slides)
  Earthquakes and earthquake-induced tidal waves (tsunamis).

- Human-induced accidents:

  Rail car spills
  Tanker truck spills
  Industrial plant spills or emissions
  Marine spills.

It is relevant to note that the emergency response to forest fires is handled entirely through the Ministry of Forests. Marine spills are a joint provincial and federal responsibility.

PEP has an annual budget of $2.8 million to operate the program, develop environmental emergency response plans and conduct emergency response training. It also receives an additional emergency vote of about $1 million per year to respond to most small human-induced accidents and small floods. In the event of a large environmental emergency (primarily flooding), the PEP authorities obtain Order-in-Council (OIC) funding to respond to the disaster and provide relief to

individuals affected. The province typically spends about $20-$25 million in OIC funds to respond to these larger emergencies.

About $55 million has been spent annually under the Fire Suppression Program (FSP) during the past eight years to respond to forest fires plus an additional $26 million for fire emergency preparedness (see Exhibit 6). In recent years, the government appears to have preferred giving the program a lower voted amount and then obtaining the shortfall of emergency funds from the Consolidate Revenue Fund.

Exhibit 6
Budgeted and actual fire suppression expenditures under the Ministry of Forests Fire Suppression Program ($ million)

Year	Actual Expenditures	Budgeted Expenditures	Variance to Budget
1984/85	$38	$46	$8
1985/86	129	47	(83)
1986/87	46	51	5
1987/88	69	60	(9)
1988/89	27	52	(25)
1989/90	42	23	(19)
1990/91	60	21	(39)
1991/92	33	21	(12)
Mean	55	40	(22)

Note: Brackets indicate funding is received from the Consolidated Revenue Fund when budget is exceeded.

A number of issues arise regarding the structure and mandate of the environmental emergency program. These are discussed below.

a) The ministry affiliation of PEP is in question

For most of the 1980s, the Provincial Emergency Program (PEP) was housed within the Ministry of Environment. However, in 1987 it was moved to the Ministry of Attorney General. It was then briefly moved to the Ministry of Solicitor General and then back to the Ministry of Attorney General. The decision to move the PEP program out of the Ministry of Environment was reportedly because that Ministry could not deal effectively with the search and rescue component of the program. It was felt that if the program was operated from a "neutral" ministry that all areas of the program would receive equal priority. While this argument may be valid, it results in a significant increase in administration costs because environmental emergencies represent the vast

majority of calls to the program. Thus, PEP officials receive calls concerning environmental emergencies, and then contact the Ministry of Environment to respond. The Ministry of Environment must then bill PEP for overtime costs and contractor fees. This administrative expense has been estimated by Ministry of Environment, Lands and Parks officials at about $50,000 per year. This administrative cost is likely to increase with the number of reported spills, which has risen from 1,200 in 1989 to 2,700 to date in 1991/92. About one-third of the reports relate to marine oil spills, and therefore has potential involvement and financial support from the federal government. By comparison, all fire-related agencies are funded through the emergency fire suppression program within the Ministry of Forests.

b) The province is not receiving full benefits from the federal DFA program

In the event of a large flood with cleanup costs exceeding $3 million, the provincial government is eligible to receive federal funds under a federal/provincial cost sharing program called Disaster Financial Assistance (DFA). The provincial government paid about $60 million and $15 million in the fiscal years of 1990/91 and 1991/92, respectively. As a result, the PEP authorities are eligible to request about $15 million from the federal government. However, the PEP authorities have only requested about $7 million, of which the federal government has only paid $2.4 million.

c) Emergency guidelines do not encourage environmental prevention

Under the current guidelines, environmental emergency funds derived from Orders-in-Council can only be used to restore an area to pre-disaster conditions. While this provision ensures that the short-term restoration costs are minimized, it may result in higher, long-term costs that could otherwise be avoided. For example, if a particular river has inadequate flood retention walls and suffers a major flood, the rules will only allow for the replacement of those inadequate retention walls. Conversely, if proper-sized retention walls were built to replace the under-sized retention walls, this could save significant future costs in the event of a subsequent flood.

d) The government has poor ability to estimate emergency fund requirements

Government officials in PEP and FSP have little information about the relative risks and magnitude of costs associated with various environmental disasters around the province. As a result, they have difficulty estimating the restoration costs that will likely have to be paid out for a particular environmental emergency. One result is that PEP authorities, for example, typically overestimate their funding requirements by about 25 per cent when they make their Order-in-Council requests.

e) The government is ineligible to recover certain costs

Due to a technicality in the Environmental Management Act, the provincial government is ineligible to recover certain types of cleanup costs from private sector polluters in the event of an industrial spill or accident. Lawyers representing polluters have successfully demonstrated that the provincial government has no authority to recover costs paid out of the PEP emergency vote.

f) Duplication of training may occur

A PEP academy exists to provide emergency response training programs to government officials and others. However, they are considered inadequate to provide the breadth of environmental knowledge needed to deal effectively with specific environmental emergencies, particularly concerning toxic spills. Consequently, the Ministry of Environment, Lands and Parks conducts a number of its own training programs, some of which appear to duplicate those provided by PEP. By comparison, the Ministry of Forests conducts its own training for forest fires.

In general, there appears to be a lack of accountability on how funds are received, paid out and collected back from outside agencies when environmental emergencies occur. Further, a number of different ministries have budgets for environmental emergencies and some confusion likely exists about which costs are paid by one ministry versus another ministry versus PEP.

3. Cost savings through environmental conservation/pollution prevention

Because the environment crosses all geographic, industry and social sectors, a small effort to reduce environmental impacts in one area can create significant environmental benefits in many other areas. These efforts can reduce costs, generate revenues, improve employment motivation, improve public image, and provide numerous additional benefits. The initial investment to launch a pollution prevention program can be recouped in less than a year in some cases.

Numerous public and private sector agencies have convincingly demonstrated that a small investment in conserving environmental resources and preventing pollution can not only reduce future environmental impacts but also yield large monetary savings. For example, the B.C. Purchasing Commission launched a program, called Project Paper Push, to recycle waste paper generated in a number of government offices. The project saved the government about $40,000 in six months and is now operating on a government-wide basis.

Many ministries do not have the financial resources to pay the initial investment costs for major conservation programs that will enable them to enjoy future savings and reduced environmental impacts once those costs have been recouped. For

example, B.C. Hydro recommends a number of methods to reduce energy consumption through its Power Smart program. One of their suggestions is to replace existing lighting systems in buildings with more energy efficient systems. While the energy savings are significant in the long run, few ministries can afford the upfront costs to make the switch.

As another example, if a modest investment was made to upgrade retaining walls on flood-prone rivers, emergency cleanup and flood relief costs to flood victims may be significantly reduced. Unfortunately, the Ministry of Environment, Lands and Parks does not have sufficient budget to make the improvements and no provision is made to upgrade the diking out of the emergency fund even though this would significantly reduce the chance of a future occurrence.

It is encouraging to note that the Ministry of Environment, Lands and Parks has recently changed its orientation from a remediation environmental management approach to a pollution prevention approach. In other words, instead of dealing with pollution once it has occurred, the emphasis will be on eliminating pollution at its source so that it is not generated. Evidence is growing that, in many cases, environmental conservation and pollution prevention not only reduce environmental impacts they also reduce costs and improve operating efficiencies. The Ministry of Environment, Lands and Parks has identified five categories of industrial pollution prevention strategies, as follows:

- Input substitution—substituting less hazardous and/or more efficient materials and energy inputs to a production process.
- In process recycling—recycling and reuse of in-plant waste products.
- Process modification—modifying production processes to optimize raw materials and energy use, improve efficiencies of material throughput and maximize outputs.
- Improved plant operations—conducting regular preventive maintenance, employee training, environmental audits and proper material handling procedures.
- Changes in end products—redesigning products to create less waste, facilitate reuse or recycling and/or contain less toxic contents.

While these strategies were designed primarily with industry in mind, they also could be implemented internally within government ministries and Crown corporations.

4. Charges for pollution offences

In the past, charges for pollution offences in British Columbia have been so low that some companies have opted to continue polluting and pay the fines rather than take

steps to reduce or eliminate their pollution. While these charges have increased recently, the fines often remain too low to be an effective deterrent.

In particular, pollution charges should be set at a level at which they provide a strong deterrent to continue polluting. The government could charge an administrative fee to oversee remediation activities conducted by the polluter. For example, if the government discovers a contaminated site and issues an abatement order for the cleanup of that site, it should be able to charge a reasonable fee to review the required cleanup plan and conduct the post-cleanup site investigation.

Contrary to the popular belief that increased environmental regulations reduce competitiveness, strong evidence is growing that more stringent environment regulations actually improve long-term competitiveness. Firms with the best record of environmental performance are often those with the best economic performance. This point was emphasized in a recent report on Canadian competitiveness, prepared by Professor Michael Porter of Harvard University.

Perhaps the strongest proof that increased pollution charges do not inhibit corporate competitiveness is the economic performance of countries with the toughest environmental regulations. Both Germany and Japan have some of the most stringent environmental laws in the world and yet they continue to maintain the best rates of productivity growth.

Increased pollution charges represent a significant opportunity for the government to generate revenues or at least cover the increased monitoring and enforcement costs that will likely arise.

5. Environmental incentives and disincentives

The budget is perhaps the provincial government's most powerful environmental policy statement. While the government can make many positive environmental statements, how it spends its budget dollars is the true test of its commitment toward the environment. By eliminating environmentally destructive incentives and introducing environmentally progressive incentives the government can fully demonstrate that it practises what it preaches.

Many people refer to the mechanisms that provide these incentives and disincentives as market-based instruments (MBIs). MBIs are generally divided into five broad categories. These categories are discussed below.

a) Environmental taxes and levies

Environmental taxes and levies are fees charged at a certain level to compensate for the associated environmental damage of products or activities. They include user fees, effluent charges, product levies and administrative duties. Charging green levies or taxes on products or activities that are environmentally damaging is an important way to ensure that environmental

costs are factored into individual and business decisions. The provincial government has introduced a number of green taxes on items such as batteries, tires, diapers, chlorofluorocarbons (CFCs) and waste discharges.

It is also considering introducing a number of new taxes or levies on items such as agricultural pesticides, appliances, and even a "carbon tax" on gasoline. While these are positive initiatives, we note that they focus primarily on waste management and to a lesser extent on air management. The government may wish to consider how it can apply these instruments to reduce water and energy consumption and minimize land degradation.

b) Environmental subsidies

Subsidies provide a monetary reward for companies and individuals that undertake pollution abatement activities or environmentally progressive programs. Examples of subsidies include grants, contributions, tax deductions, rebates and credits, flow-through tax features, provincial stock savings plans and so on. To our knowledge, the only environmental subsidies provided by the provincial government are potentially used to assist firms in the recycling industry. Significant opportunities likely exist to provide subsidies in other environmental disciplines (air, water, land) that would generate positive returns to the government.

c) Deposit-refund systems

In a deposit-refund system, a surcharge is added to the purchase price of a potentially polluting product and then refunded when that product is returned. Deposit-refund systems have been applied most widely on beverage containers. In Sweden, a deposit-refund system exists for cars, which discourages them from being abandoned. British Columbia has a deposit-refund system for soft drink and beer containers. It is in the process of expanding the deposit-refund legislation to include a much wider variety of beverage containers.

d) Enforcement incentives

In this type of MBI, a financial penalty is introduced in the form of a Surety Bond or Delay Penalty as an incentive to ensure compliance with legislated target reductions in certain types of emission, effluent or waste levels. It has been used in the United States, the United Kingdom and Scandinavia but to our knowledge it has not been introduced in British Columbia. Consideration may be given to applying this type of MBI to CFC reductions or other hazardous materials.

e) Tradeable or marketable rights system

Under this system, prospective polluters are given rights to sell unused levels of permitted discharge. Thus, companies that have achieved significant reductions in discharges below their permitted levels can receive a monetary reward for their efforts. Tradeable permits are used widely in the United States and are effective in achieving desired reductions within a geographic region. However, some people philosophically oppose this system because it allows companies to "buy" the right to pollute. Furthermore, large companies such as the 3M Corporation have refused to sell the unused portion of their tradeable permits. Tradeable permits have been considered as a way of reducing air emissions in the Lower Mainland of British Columbia.

In general, MBIs are an efficient way to meet environmental objectives because they send a price signal and let market forces go to work. A comprehensive set of such economic instruments will help substantially to move the provincial economy toward sustainability. Used in combination, MBIs can generate significant government revenues and reduce government costs. As such, they represent an effective alternative to increasing sales taxes and income taxes, which penalize everyone and provide no incentive for behaviour change.

While the provincial government has introduced a wide variety of progressive environmental incentives, it also provides a number of subsidies for environmentally damaging activities. It would be to the government's environmental and monetary benefit to identify these environmentally regressive subsidies and to reduce or eliminate them. In this report, we provide one major example of an environmentally damaging subsidy, which pertains to automobile use.

To save environmental costs that result from automobile use, it is important for the government to reduce the large subsidies provided for automobile transportation and re-order its transportation priorities. It can begin this process by revealing the hidden costs of automobile use, which include the following:

- **Air pollution**

  Within the past decade, air pollution levels in British Columbia, particularly in the Lower Mainland, have risen dramatically. Vehicle emissions produce a number of air pollutants including nitrogen oxides, hydrocarbons, carbon monoxide, and ground level ozone. These pollutants contribute to increased respiratory-related health care costs. Vehicles also emit carbon dioxide, which can potentially lead to global warming (an environmental problem with even larger and less quantifiable environmental costs).

- **Road construction, maintenance and repair**

  The annual provincial government budget for road construction, maintenance and repair is about $900 million. A significant portion of this budget could likely be reduced if there was a shift away from single-occupant vehicle (SOV) transportation.

- **Municipal services**

  Based on figures for other North American jurisdictions, British Columbia likely spends about $600 million annually in providing police, fire, and ambulance services that are automobile-related. Factoring in these costs, other transportation alternatives quickly become much more economical.

As long as vehicle owners receive the aforementioned subsidies at no direct cost, they are unlikely to make the best use of buses, trains, and bicycle paths.

6. Valuation of environmental assets

British Columbia possesses a tremendous endowment of natural resources such as forests, fisheries, wildlife, fresh water and soil that provides numerous economic benefits to the province. These environmental and economic assets have the potential to generate significant future income for British Columbians. Unfortunately, our current accounting procedures (which are common to all industrial economies) do not recognize our natural resources as productive assets that appreciate or depreciate over time. Because of this discrepancy between how we measure economic activity and how we value the use of our natural resources that sustain our economy, we may be receiving misleading signals about our economic health.

This discrepancy also sends misleading signals to our provincial government policy makers. Our lack of information on the changing value of our environmental assets has the potential to create the notion that we can expand economic growth by exploiting our natural resource base because such activity tends to increase our Gross Provincial Product (GPP). In reality, these gains in our current income may be being made at the expense of losses in the economic wealth of our province. We tend not to consider our natural resources as productive capital even though we use them as such. Hence, a danger exists that we may be liquidating our natural assets as opposed to living off the interest payments derived from them.

By establishing some type of financial recognition for our environmental and natural resource assets in the provincial governing process, we could substantially improve the information base necessary to preserve and conserve our environmental and natural resources. This information base would further allow the provincial government to better integrate environmental and economic considerations, which currently are fragmented between a number of ministries and Crown corporations.

As natural resource valuation and accounting methods become established, our provincial government agencies will be able to develop a better understanding of the following:

- The relative cost of pollution damage and resource degradation.
- The full cost of repairing damage once it has occurred.
- The savings gained from preventing damage at source.

Environmental and natural resource accounting can also be used to improve the provincial government's ability to assess the long-term costs and benefits of policies designed to protect natural resources and improve environmental quality. These assessments could then be linked back into current year decision-making.

Environmental accounting methodologies can be applied in two ways. Firstly, they can be used on a province-wide basis to develop, for example, a revised system of provincial accounts (SPA). Secondly, they can be used at the industry level to determine the optimal use of a particular natural resource from a sustainable development perspective. The B.C. Round Table on the Environment and Economy is currently studying the practical application of these environmental accounting methodologies for British Columbia.

7. Transfer payments to regional and local governments

The provincial government makes large transfer payments to the regional and local governments across the province. The size of the total payments to each regional and local government is established by a funding formula that considers local population levels, expenditures, tax assessment levels, and so on. A portion of the transfer payments are unconditional while the remainder are tied to specific items such as police costs and health care costs. The most significant environment-related conditional payment is for improvements in water supply and wastewater treatment. As can be observed in Exhibit 7, payments to local governments for water and sewer improvements have increased dramatically, not only in absolute terms but also as a percentage of total transfer payments. This reflects the fact that the majority of the transfer payment increases are being spent on water and sewer improvements.

Exhibit 7
Value of water and sewer transfer payments from the provincial government as a percentage of total transfer payments ($ million)

	1989/90	1990/91	1991/92
Water and sewer transfer payments	$ 35	$ 65	$ 97
Total local government transfer payments	$ 302	$ 341	$ 376
Percentage of water and sewer payment of total payments	12%	19%	26%

The Ministry of Municipal Affairs, which administers the payments, claims that it will cost about $1 billion to upgrade the water and sewer infrastructure to desirable levels. Thus, if expenditures were to continue at 1991/92 levels, it would take about ten years to make the necessary municipal infrastructure improvements. At present, many communities in British Columbia do not meet the minimum water quality objectives set out in their water permit licences.

It is relevant to note that the largest expenditures for water and sewer improvements are required in the densely populated urban areas of Vancouver and Victoria. These urban communities are spending about $200 million each to upgrade their sewage treatment facilities. The province will likely pay 25-50 per cent of these costs. The government should closely monitor these environmental costs and encourage local governments to reduce water consumption so as to make better use of the transfer payments.

8. Fiduciary obligation of British Columbia government to ensure traditional aboriginal activities

A recent B.C. Supreme Court ruling has stipulated that the provincial government has a fiduciary obligation to ensure the aboriginal right to conduct traditional activities, including hunting, food and berry gathering and other cultural activities. The aboriginal right to fish for sustenance has already been affirmed.

The impact of this fiduciary obligation has been discussed by many government officials in several ministries that deal with aboriginal affairs. No estimates of the costs to the provincial government have ever been produced. However, several types of costs can be identified and these include:

- Costs associated with restrictions on development. Public and private sector developers may be required to modify their activities so as not to interfere or conflict with the aboriginal right to conduct traditional

activities. In the extreme case, this may prevent developments from occurring.

- Costs associated with developing government policies and meeting with aboriginal groups to resolve issues.

- Costs associated with lost income from hunting licence sales that do not occur. Aboriginals would have first priority, beyond conservation, for hunting and this could mean restrictions on non-aboriginal hunters.

However, an appeal has been filed by the Gitksan Indian Band because the Supreme Court ruling denied sovereignty rights for aboriginals. The appeal process could take anywhere from two to ten years to resolve. Until the case is resolved by the legal system, the costs to the provincial government will not be significant. The most direct cost to the government in the short term is the cost of developing policies and resolving issues with aboriginal groups. The long-term impact, however, could be very significant given the potential conflicts with development on lands that support traditional aboriginal activities.

9. Compensation costs for Crown lands redesignated as park lands

The new government has promised to double parkland acreage in British Columbia by the year 2000. This would increase park holdings from 6 million hectares to about 12 million hectares—or about 12 per cent of the total land base in the province. The new government's ability to fulfill this commitment will be mitigated by several limiting factors including budget constraints, opposition from TFL (tree farm licensees) and other tenure holders, and the length of the time required to integrate public input.

The former Ministry of Lands and Parks typically had an annual budget of $2-$5 million for the acquisition of private land or the buy-back of rights previously issued. The lands are usually coastal or lake-front properties on the east side of Vancouver Island, the Sunshine Coast, Okanagan Valley or Kootenay regions. Ministry of Environment, Lands and Parks officials have requested a $7 million budget for land acquisition for the 1992/93 fiscal year.

The majority of lands in British Columbia suitable for park designation are Crown lands—so no acquisition costs are necessary. The land use designation is changed and the only potential cost is for compensation of timber rights that may have been given out. No protocol is currently in place to estimate or negotiate compensation for the loss of tenure. The government's standing policy towards tenure-holders on lands designated for parks can be summarized as follows:

- Mineral developers with rights are given a minimum of 10 years to prove the viability of mineral deposits.

- Oil and gas developers typically have shorter rights. Holders are thus given a short-term opportunity to explore and prove reserves.

- TFL tenure holders are area-based, and government retains the right to withdraw land from a TFL without compensation where it does not affect the allowable cut. In addition, the government may withdraw from a TFL, without compensation, land attributable to up to 5 per cent of the allowable cut.

Because TFL holdings on Vancouver Island are volume-based, they are more likely to result in compensation. Lengthy negotiations will likely be involved. The only major compensation of a TFL for parkland acquisition involved the recent establishment of a national park on South Moresby Island. In the case of a national park, lands are totally withdrawn from provincial control. The federal and provincial governments have agreed to share the compensation costs in the South Moresby case. The provincial government reportedly paid $9.5 million of the total $37 million compensation costs.

No claims have been settled with aboriginal groups in British Columbia that establish aboriginal control over Crown lands. Thus, no aboriginal bands have received compensation for areas designated as parklands. According to ministry officials any future negotiated land claims will not likely involve specific compensation for parklands designation.

The loss of tenure due to the redesignation of Crown land and potential compensation issues will require new provincial government policies and guidelines. The economic costs of the government's exposure cannot be estimated accurately at this time. However, the short-term costs of policy development and public input should be included in the five-year budget and could range upwards to $5 million over the five-year period.

G. Recommendations

In general, the provincial government has very little consolidated information on environmental cost issues that could materially affect the provincial government budget. A strong need exists to compile environmental cost information from a number of ministries and Crown corporations, and to maintain and update that information in a centralized location. This general recommendation is expanded upon through a number of specific recommendations in the following subsections.

1. Mitigating strategies

a) Develop a centralized registry of contaminated sites

The undetermined degree of contaminated land site cleanup required for property holdings represents a significant liability risk for the government.

We recommend that the current schedule for reviewing land sites be accelerated. By advancing this schedule, the government will have a clearer understanding of its liability and asset values. Furthermore, this will enable contamination problems to be addressed before they grow in magnitude and severity.

In addition, we recommend that a central registry of all contaminated sites be established within the Ministry of Environment, Lands and Parks. Such a registry will enable the government to better prioritize site cleanups and select optimal treatment or containment technologies. The government may wish to introduce mandatory disclosure requirements to ensure that the registry is accurate and up-to-date.

b) Conduct an evaluation of the Provincial Emergency Program

A program evaluation should be conducted of environmental emergency programs, especially the Provincial Emergency Program. This evaluation should address allocation of monies and funds between the various ministries that deal with environment-related emergencies. In addition, a mechanism should be explored by which preventive action can be taken on a coordinated basis to minimize the occurrence of an environmental emergency.

c) Expand incentives to encourage preventive environmental management approaches

Virtually all of the ministries and Crown corporations should develop a major role in encouraging industry, the public, and even their own counterparts to adopt preventive approaches to environmental management. While these preventive approaches generally require a moderate initial investment, they can often pay significant dividends in the long run.

d) Develop a pollution prevention program for the government

The government could significantly boost its environmental credibility with the public by implementing a pollution prevention program for ministries and Crown corporations. This would involve a systematic environmental performance review to identify and follow-up on all opportunities for Crown agencies to reduce, reuse, and recycle their wastes, conserve energy, reduce water consumption, minimize air emissions, and revamp purchasing practices.

e) Set charges for pollution offences high enough to deter environmentally damaging activities

In accordance with the "Polluter Pay" principle, the Ministry of Environment, Lands and Parks should seek legislative amendments establishing minimum fines for pollution offences at a level that reflects the true full environmental

cost of the pollution and, more importantly, serves as a deterrent to future environmentally damaging activities.

f) Provide incentives for local governments to conserve water and other environmental resources

As a significant contributor of local government funds for water and sewage projects, the provincial government should provide incentives for local governments to conserve water consumption and thereby reduce water supply and waste water treatment costs. As a regulator of building codes, the provincial government should also provide incentives for local governments to implement energy efficient and environmentally sound buildings.

g) Establish new policies to address the compensation of redesignated Crown lands

The provincial government should establish new policies to address the compensation of Crown lands that are redesignated as park lands. Considerable uncertainty exists about the current method and eligibility of compensation. The government will save considerable time and money by addressing this issue before new claims are presented.

2. Further study

a) Develop methods of risk assessment for environmental emergencies

As mentioned in the previous section, the government has little information on the magnitude and probability of risks associated with particular environmental emergencies. It would be beneficial to develop formal methods of risk assessment. This would allow the government to better determine priority areas in which to take preventive measures. It would also serve to more accurately estimate funding requirements subsequent to an environmental emergency.

b) Develop methodologies for assigning values to environmental assets

A number of methodologies exist for assigning values to environmental assets. The government should conduct a comparative assessment of these methodologies and select those methodologies that are most appropriate for British Columbia. As part of this process, the government could develop a series of environmental quality indices, which it could subsequently track over time. These environmental accounting functions could be incorporated into the state-of-the-environment reporting function of the Ministry of Environment, Lands and Parks.

c) Identify market-based instruments that would provide incentives to environmentally sound behaviour

The provincial government should conduct a formal investigation of the ways in which market-based instruments could be used to encourage individuals and organizations in British Columbia to move towards sustainable development. This research would place strong emphasis on the results achieved through the use of MBIs in other jurisdictions.

d) Conduct an environmental assessment of provincial government budget

The provincial government should conduct an environmental assessment of its budget to ensure that it is not promoting unsustainable practices. Such an assessment will provide more information than any other single initiative on the environmental impact of the government's spending and revenue generating programs. This assessment would coincide with the provincial government's policy that all major projects with probable environmental impacts should undergo a formal assessment process.

Appendix A

Environmental Policy Statements Of Selected Ministries And Crown Corporations

B.C. Buildings Corporation

Primary Environmental Aims

- To minimize the impact of our operations on our air, water, land and living organisms.
- To consider the environment in every aspect of business planning and decision making.
- To reduce our waste and our use of raw material and energy.
- To foresee and minimize the environmental impact of future actions and decisions.
- To establish clear and exemplary environmental standards.
- To communicate to and educate our employees and customers about our environmental initiatives and their important implications.

B.C. Hydro

Board of Directors' Resolution

The Board of Directors of B.C. Hydro has adopted the following resolution:

> "In carrying out its business, B.C. Hydro will minimize adverse effects on the natural and social environment and actively pursue opportunities to manage our resources for the benefit of present and future generations."

Environmental Principles

We have adopted a set of eight principles which provide the basis for the day-to-day implementation of the resolution:

- Include consideration of the full range of natural and social environmental impacts in all of B.C. Hydro's actions from initial planning and operations to decommissioning and disposal.
- Promote a balance between resource use and conservation in providing B.C.'s energy needs.
- Utilize presently developed resources to achieve optimum efficiency before developing new energy sources.
- Pursue opportunities to replace in kind natural or social resources affected by B.C. Hydro's actions.
- Promote appropriate recreational and commercial use of B.C. Hydro reservoirs, rights-of-way and other properties.
- Develop an ongoing corporate-wide audit process of environmental performance, for regular review by the Board of Directors, to ensure that risks to safety, health and the environment are minimized.
- Become a corporate leader in furthering awareness of local, provincial and global energy issues and actively participate in actions to deal with those issues.
- Work with industry, government, public and other institutions to create and maintain a safe environment through a cooperative approach that shares information, knowledge and experience.

B.C. Transit

Environmental objectives

- To continue to build awareness of the detrimental environmental impact of SOV commuting.
- To motivate individuals residing in the Lower Mainland to replace 20 per cent of (2 in 10 weekly trips) SOV trips with an MOV trip by transit or carpool.
- To coordinate and integrate the efforts of the program participants and other affected jurisdictions.

Key strategies

- To augment the funding resources of the four primary partners with monies from other government agencies (notably MOE) and the private sector where possible. Sponsorship of particular pieces or programs.
- To utilize local employers as a primary means of reaching and motivating individual residents to GO GREEN through the TOP program and carpooling.
- To maintain public awareness levels by utilizing a range of advertising media.
- To establish a professional association of "Go Green" coordinators to promote networking and information sharing.
- To establish a literature bank and speakers bureau with emphasis made up of committee members on professional audiences.
- To design and test a pilot ride-share program for "unaffiliated" individuals.
- To access business organizations i.e., Board of Trade as focal points for corporate participants.

B.C. Rail

Corporate commitment

A "mission statement" which summarizes B.C. Rail's corporate commitment to environmental management is proposed as follows:

> B.C. Rail is committed to ensuring that its operations and activities are carried out in a manner which is in compliance with evolving regulatory requirements. The railway will adopt best industry management practices for achieving a high quality of environmental protection and human health in all areas and endeavours affected by its activities. In applying this commitment, B.C. Rail will communicate its policies, procedures and practices with employees and the public consistent with an overall objective of harmoniously working towards mutually acceptable environmental goals.

Environmental management objectives

Specific objectives, the fulfillment of which will enable the corporate commitment for environmental management to be realized, are proposed as follows:

- To comply with all applicable environmental laws and regulations.
- To create within B.C. Rail, at all levels and in all areas, an awareness of corporate environmental policies for environmental protection.
- To take all necessary steps to identify environmental problems and to respond with effective remedial strategies, utilizing best management practices.
- To establish and periodically update environmental codes of practice, standards and protocols.
- To conduct periodic environmental audits and re-evaluate priorities.
- To provide adequate human, material and financial resources to address environmental problems in a timely and effective manner.
- To promote good environmental practices amongst contractors, vendors, consultants and other outside parties by preference to those who demonstrate superior environmental awareness and responsibility.
- To provide adequate response capabilities to deal with emergencies.
- To provide B.C. Rail employees with continued education and training on environmental matters.

B.C. Ferry Corporation (Draft Policy)

Global Statement

The British Columbia Ferry Corporation recognizes our environmental obligations. We are committed to global environmental stewardship. We believe that our service objectives should be consistent with environmental goals.

Commitment to sound environmental practices

- We will make the environment a priority in evaluating and planning services, facilities, and other business decisions.
- We will implement environmentally sound policies designed to prevent, mitigate and where appropriate, remedy impacts on the environment.
- We will communicate and instill an organizational commitment to environmental protection throughout the corporation. We will ensure that all levels of the organization understand their responsibility and accountability for implementing sound environmental practices.

Commitment to broader-based efforts

- We will be proactive in promoting sound environmental principles and practices throughout our Fleet and share our experience and expertise with others.
- We will establish and nurture open communications with our customers, the communities we serve and our employees to be responsible to their environmental concerns.
- We will foster a constructive working atmosphere with other interested parties such as environmental organizations and all levels of government.
- We will actively participate in the development of sound environmental laws and regulations, working with governments and other interested parties.

Commitment to environmental laws and regulations

- We will put in place policies, programs and procedures to ensure compliance with the intent as well as the letter, of laws and regulations. This includes establishing goals and targets against which progress can be measured.
- We will conduct environmental reviews to evaluate environmental performance measuring progress against goals and targets.
- We will ensure that B.C. Ferry employees are informed of environmental requirements and trained as needed to implement policies.

Protection and conservation

- We will develop and implement environmentally safe practices.
- We will minimize the generation of discharges to the environment including, but not limited to, hazardous and non-hazardous waste.
- We will develop sound waste management practices.
- We will commit to recycling and reduce disposal burden.
- We will commit to the wise use of energy including improved energy efficiency.
- We will encourage and recognize the contributions employees make towards improved environmental performance.

B.C. Purchasing Commission

Environmental purchasing policy

Using the power of purchasing to promote environmentally sensitive products and processes—which add value to the provincial economy.

As a major consumer of goods and services, the B.C. government needs to lead by example. That's why the B.C. Purchasing Commission developed the **Environmental Purchasing Policy** to ensure that our ministries and agencies are "environmentally friendly" by using goods and services which take environmental concerns into account.

Close the loop strategy

The policy addresses the Purchasing Commission's responsibilities:

- To **use** lifecycle analysis of products to consider environmental impacts of production and disposal.
- To **increase** demand for environmentally sensitive and recycled products by purchasing them where it is efficient to do so, to ensure that the market remains viable.
- To **increase** recycling activity where possible, e.g., through the collection of paper and waste oils for recycling.

In short, the Purchasing Commission will support the market for recycled and environmentally sensitive products by increasing both supply and demand, where practical and effective, and will encourage economic development in recycling and related industries.

The policy's premise is that, by purchasing environmentally sensitive materials and disposing of its waste in an environmentally responsible manner, government can:

- Encourage development of environmental value added products and processes which increase import replacement, job creation and conservation of resources while reducing waste disposal charges and landfill dumping.
- Set an example in waste management leadership by recycling.
- Increase public information on the quantity, quality and true cost of environmentally sensitive products available.

Principles of sustainable development

Limiting our impact on the living world to stay within its carrying capacity

The carrying capacity of an ecosystem (an inter-related community of plants and animals) is its ability to renew itself or to absorb wastes. Careful management can increase carrying capacity, but limits must be respected when making development decisions. Identifying those limits requires detailed scientific study in the absence of scientific data, social values may be substituted as standards in making judgements.

Preserving and protecting the environment

Preserving and protecting the environment involves three requirements:

- Conserving the life-support services, which are the processes that allow land water, air and life to be productive, to adapt and to renew themselves, and which include the chemical balance of soil and water, stable climates, food supplies and the recycling of nutrients along the food chain, and the cleansing of polluted air and water.

- Conserving biological diversity, which means ensuring that there is a proper variety of different life forms in all niches of the environment, and that there is a varied genetic pool within the population of each species the potential usefulness to humankind of many plant species (for example, as sources of medicines) has not yet been determined plant or animal populations that are not genetically diverse can be less resistant to disease or pests.

- Ensuring that our use of renewable resources is sustainable (which means conserving soil, wild and domesticated plants and animals, and ecosystems) across the whole province, some ecosystems will be preserved, others will be modified by development.

Holding to a minimum the depletion of non-renewable resources

Some resources, such as petroleum, cannot be renewed. More efficient use of these resources, and recycling (as is done with used motor oil) can extend their useful life. But, when lifetime costs are compared, it may be economically more prudent to develop substitutes for non-renewable resources, such as by making methanol from organic waste as a substitute for fossil fuels.

Promoting long-term economic development that increases the benefits from a given stock of resources without drawing down on our stocks of environmental assets

British Columbia, as a small part of a global economy, must compete for markets, investment capital and skilled people. Our existing and expanding future population requires economic development to sustain it and we must strive for sustainable communities. Gaining sustainable benefits from our province's natural wealth could involve:

- Favouring technologies and management techniques that make the most efficient use of each resource.

- Developing accounting methods that allow prices and taxes to reflect the full costs of economic decisions (for example, we cannot judge which is better—electric or natural gas cars—until we compare for each the total costs of mining, processing, energy, assembly, transportation, repairs, environmental impacts and disposal over the lifetime of each product.

- Ensuring that measures of economic performance include the costs of environmental damage and depletion of the natural resource base (for example, present methods of measuring economic activity make the Exxon Valdez oil spill appear as a source of growth for Alaska's domestic product).

- Building upon and diversifying our present high-volume resource industries to develop high value service and information industries that create wealth from the processing of information (for example, computer mapping systems).

- Anticipating and understanding the effects of development decisions on other sectors and interests (for example, hydro-electric dams that provide power for a distant region's industries mean environmental and social consequences for the region around the dam site or range land set aside for cattle can affect the wildlife on which the area's tourism industry depends).

Aiming for fair distribution of the benefits and the costs of resource use and environmental protection

The benefits and costs of resource use and environmental protection have not always been shared equally among different communities and interest groups, among regions that are poor and those that are affluent, and between our generation and those who will come after us.

The transition to sustainability will mean more difficulties for some communities and interest groups than for others.

People who make their livings from unsustainable activities will need help in making adjustments.

Promoting values that support sustainability

To be successful, sustainable development must rest upon social values that holds sustainability to be morally good. Values that support an understanding of the interdependence or environmental, social and economic interests should be encouraged, while those which do not should be changed.

Appendix B

Estimated Cleanup Costs Of Known Contaminated Sites ($ million)

Contaminated Site	Cleanup Costs Spent to Date	Future Costs Budgeted	Remaining Cleanup Costs	Total Cleanup Cost
Environment, Lands & Parks				
Expo lands	$17.5	$8	$30-$80	$50-$100
Wells Mine site	0.2	0.4	?	?
Trail contamination	0.2	0.3	?	?
Lamford Forest Products site	0	0	0.5	0.5
Ocean Falls Pulp Mill	0	0	2	2
Energy, Mines & Petroleum Resources				
Mount Washington Mine site	1	0.2	0.2	1.2
Britannia Beach Mine site	0.2	0	4	4
Duthie Mine site	0	0	0.2	0.2
Aniot Mine site	0	0	0.5	0.5
Tulsa Mine site	0	0	1	1
Various oil well sites	0.2	?	15-30	15-30
Transportation & Highways				
Quesnel site			neg.	0
Terrace Grande Prairie	0.1		0.3	
Kamloops	0.1		neg.	
B.C. Hydro				
Rocky Plant site	0.2	?	1-10	1-10
Murrin-Vancouver sites	0.1	?	0.4-4	0.4-4
Kitchener site	0.05	?	0.3	0.3
B.C. Buildings Corporation				
Oakalla Jail	0	0	0.3	0.3
Mission (highways yard)	0	0	0.35	0.35
Anaheim Lake (highways yard)	0	0	0.35	0.35
Various highway yards	0	0	11-60	11-60

Note: These figures are very approximate and many have not yet been confirmed by the individual agencies.